

Daily syllabus

Beam Reach program

Spring, 2008: March 31 – June 08

Research theme: Acoustic investigation of orcas and their environment

Instructors:

Dr. Jason Wood (Lead)
Dr. Val Veirs
Eric Eisenhardt
Dr. Scott Veirs
Captain Todd Shuster
Captain Mike Kramer

Students:

Juan Bacigalupi
Lindsay Delp
Laura Howes
Ryan Spragg
Dominique Walk

The Beam Reach under/graduate program is an intensive 10-week research and educational experience. The general curriculum which structures the program is described in detail at <http://beamreach.org/curric/>

This syllabus articulates how the general curriculum is implemented with a focus on acoustics and orcas in the Pacific Northwest. As it describes day-to-day activities in the future, the syllabus is (of course) always under construction. You may want to utilize the on-line version to access hyperlinks; it is available (in the most updated form) at <http://beamreach.org/081/syllabus.doc>

We encourage you to re-visit the online version frequently and to keep abreast of the expectations, plans, readings, assignments, and opportunities as they evolve. We may alter this syllabus at any time.

Class structure:

Our general approach is to concentrate relatively structured, formal classroom work in the mornings. Typical morning activities will include lectures, guest presentations, demonstrations, discussions, small-group activities, etc. The afternoon sessions will generally be more freeform and informal, commonly involving lab exercises, field trips, group discussions, conversations, independent or small group work, practices, trainings, etc.

Jason will be present during most classes and sessions on land. Val lives on San Juan Island and will participate as an instructor throughout the program. Eric will be a new part of the instructor team, adding content and expertise related to fish bioacoustics. Scott will assist the instructor team by coordinating the program with Tracy in Seattle and by teaching during key portions of the program.

Jason and Todd or Mike will be aboard while at sea and will facilitate a daily class for 2 hours in the morning, Monday—Saturday. Val, Eric, Scott, and/or a guest scientist will also be aboard intermittently to conduct research, collaborate, or supplement class presentations. Along with your classmates, you will share a rotating responsibility for daily class-time reports on ship systems, weather, navigation, science, etc.

Advisory meetings:

You will meet at least weekly as an individual student with an advisor. The intent of the meeting is to help you successfully achieve the educational outcomes of the Beam Reach program, with special attention directed at guiding you through the research process and mitigating any personal challenges that arise for you. We expect the meetings to range from vigorous discussions of your research interests and ideas to thoughtful conversation about your goals and *any* difficulties you are experiencing (academic, personal, medical, psychological, etc.)

All instructors are available to serve as general advisors and academic mentors throughout the program; however Jason and Val will be your principal mentors. Our plan is to meet with you weekly in a mentor/advisee meeting. Other willing experts can provide additional mentoring to you. Please refer to the Beam Reach handbook for other resources (other than your instructors) that you may utilize in especially difficult or emergency situations.

Learning outcomes:

As described in the introduction to the curriculum, if you successfully complete the Beam Reach curriculum, you will have mastered:

1. each step in a 10-week research collaboration with peers and a scientific mentor -- from initial questions and proposals on land, through data collection and analysis at sea, to final papers and presentations in the destination port;
2. a basic understanding of the oceanic environment, marine ecosystems, and human interaction with the sea;
3. assessment of sustainable technologies, especially those utilized on the Beam Reach vessel, and implementation of a service project that makes a marine activity more sustainable;
4. safe navigation and efficient operation of a sailing research vessel during a 5-week voyage; and
5. setting and achieving personal goals, cooperating within a small group, and acting as a leader.

Assessment:

Assessment of whether you successfully achieve the learning outcomes of the Beam Reach program is accomplished through a combination of instructor, peer, and public evaluations. Here are the specific assessments, each associated with one or more of the learning outcomes. The orange background demarks assessment for Marine Field Research (Ocean 360, 10 credits); purple demarks assessment for Practicing Sustainability Science (Ocean 365, 8 credits).

	Instructor(s)	Peers	Public	subtotals	% Total/course
5 burning questions	10			10	2%
Proposal					
rough	40			40	7%
preliminary data product	20			20	4%
final	45			45	8%
Paper	200			200	35%
Presentation	75	25	30	130	23%
Journal Club	50			50	9%
Class Exercises (7 worth 10 each)	70			70	12%
Sustainability innovation	180			180	41%
Service project	50		25	75	17%
Class Exercises (3 worth 10 each)	30			30	7%
Performance tasks	40	10		50	11%
Blogging	50			50	11%
Cooperation & Leadership	30	20		50	11%
Credit totals	890	55	55	1000	
% of credits	89.00%	5.50%	5.50%		

Notes regarding the syllabus and daily schedules:

Assignments are in *red italics*; Assessments are in ***bold red italics***

Abbreviations:

JW Jason Wood VV Val Veirs EE Eric Eisenhardt SV Scott Veirs TS Todd Shuster MK Mike Kramer

Week 1: March 31 – April 06 (First week on land: from curiosity to proposal)

Goals and themes:

- Nurture your curiosity and develop thoughtful scientific questions. Define questions and begin draft proposal.
- Grasp broad context of orcas and their environment. Begin developing service project ideas and contacts.
- Begin thinking about acoustics, technologies available for projects, and mitigation technologies.
- Advisor meeting focus: turning questions into draft research proposal.

Assignments:

Due Tuesday morning: 5 initial questions

	8:30-10 am	10:30-12	12-2	2-3:30 pm	4-5:30	Evening
Mon 31	Lime Kiln field trip: 21 questions		Lime Kiln Lunch/Tour	Syllabus tour: (Guide; rubrics)	Orientation to FHL Dock @ 4:00	<i>Read Recovery Plan for discussion</i>
Tue 01	Review of past research & available equipment (JW, VV)	Computer orientation		Discuss: Recovery plan	Library tour 4:00 Literature review Print an interesting article.	<i>Read: proposal rubric & handout, and your interesting article</i>
Wed 02	Due: 5 initial questions Acoustics: intro (JW)	Acoustics: demo (VV)		Advisor meetings / set goals Work on lit review / intro of proposals		<i>Read: Sound Exposure and SRKWs by Marla Holt</i>
Thu 03	Fish of the SJI's & marine reserves (EE)	Sonic telemetry tagging (EE)		Discuss: Sound Exposure & SRKWs	Service project possibilities and partners	
Fri 04	Salmon in the SJI's (EE)	Acoustics Technology: dock exercise with hardware		Guided proposal work	First knots Dinghy sailing	6:30 reception 7:00 talk Kathy Fletcher: Marine Stewardship: State of the Sound and the San Juan Islands. TWM
Sat 05	Visit whale museum?; row to town?					
Sun 06						

Week 2: April 07 – April 13 (Second week on land: proposal and service project development)

Goals & themes:

- Ongoing exploration of instrumentation and methods available for projects
- Initiate contact with service project partners
- Advisor meeting focus: discuss proposal draft

Assignments:

Due: Thur 8:30 – first draft proposal

Due: Fri 8:30 – stats ex. #1

Due: Fri 5:30 – sound spreading ex.

	8:30-10 am	10:30-12	12-2	2-3:30 pm	4-5:30	Evening
Mon 07	Sound spreading: analysis (VV)	Acoustics: Software tutorial (JW)		Kari Koski: Sound Watch	Guided work on proposals	
Tue 08	Energy & Power: systems, science & applications (VV)	Service project: make decisions/contact		Whale watching		
Wed 09	Intro to stats/methods (JW)	Russel Barsh: What do salmon eat?		Guided work on proposals		<i>Sustainability reading: excerpt from "Omnivore's Dilemma"</i>
Thu 10	Due: draft proposal Discussion: "Omnivore's Dilemma"	Advisor meetings: discuss draft proposal. Work on stats exercise #1		Sustainability field trip with Fiona Norriss SJNI to Westcott Bay Oyster Farm & then Center for Whale Research		
Fri 11	Due: stats ex. #1 Sound recording exercise (VV) Record/analyze acoustic data Source levels, duration, frequency			Work on sound spreading exercise Due: sound spreading ex.		
Sat 12	Meeting of NW Student Chapter of Society for Marine Mammalogy, UBC					
Sun 13	Vancouver Aquarium visit and return to Friday Harbor Lab					

Week 3: April 14 – 20 (Third week on land: review and revision of proposal)

Goals & themes:

- Revise proposal based on advisor discussions
- Continue practicing with acoustic technologies and other equipment/methods.
- Implement service project
- Advisor meeting focus: refine draft proposal and prepare to implement it

Assignments:

Due: Wed 8:30 – Energy & Power ex.

Due: Fri 8:30 - Background noise ex.

	8:30-10 am	10:30-12	12-2	2-3:30 pm	4-5:30	Evening
Mon 14						Read journal club article Tracy's B-day
Tue 15		Journal club: staff lead discussion (on ferry to Anacortes)		Nols food rationing training / food provisioning: Mt. Vernon		<i>Energy and Power ex.</i>
Wed 16	Sound localization (VV) Due: Energy & Power ex.	Sustainability: Food choices		<i>Return rubric & reviewed proposal.</i> Hydrophone calibration demo		Dominique's B-day
Thu 17	Acoustic masking: sound reception (JW)	Puget Sound Meteorology (VV)		Advisor meetings Proposal work		<i>Background noise ex.</i>
Fri 18	Group science and food planning Due: Background noise ex.	Sustainability: Nutrients in the local waters		Provisioning for week at sea	Hypothermia intro Cold plunge experience	Prepare/print articles for journal club at sea
Sat 19						Initial packing/cleaning
Sun 20	Final packing and cleaning of FHL housing		Load gear onto Gato Verde and depart FHL dock			

Week 4: April 21 – 27 (First week at sea; Guest berths: Scott, Eric, Val)

Goals & themes:

- Practice and test proposed procedures; trouble-shoot instrumentation/analysis
- Sail and safety training
- Science content: Meteorology, practical tidal theory, and navigation
- Monitor energy use on Gato Verde; compare/compete with previous years.
- Advisor meeting focus: Set ritual for positive feedback on personal factors (task, leadership, community)

Assignments:

Due : Fri 8:30 – Localization ex.

Due: Sat 8:30 – Behavior ex

	8:30 am -12:00 pm	12- 5 pm	Evening
Mon 21 TS	Safety on boat and sailing intro (TS)	Divvy up chores / set up rotations for monitoring energy data / intro to energy system, waste, water, etc onboard	
Tue 22 TS	Passage planning / navigation / radio use (TS)	Earth Day	<i>Read journal club article</i>
Wed 23 TS	Passage planning / Gato Verde propulsion/power system (TS)	The orcas' physical environment (SV)	Journal club
Thu 24 TS	Passage planning Parts of a boat (TS)	Collect localization data	<i>Localization exercise</i>
Fri 25 TS	Passage planning Due: Localization ex.	Global warming and marine biodiesel (SV) Advisor meetings Collect behavior data	<i>Behavior exercise</i>
Sat 26 TS	Passage planning Due: Behavior ex.	Re-provision/clean GV at FHL	
Sun 27 MK	Passage planning		

Week 5: April 28 – May 04 (Second week at sea; Guest berths:)

Goals & themes:

- Intensify planning for sea component and evaluate land component
- Advisor meeting focus: discuss data quality, methods revision, and personal growth
- Continue exploring sustainability science

Assignments:

Due: Tues 8:30 – Hydrophone calibration ex.

Due: Fri 8:30 – Stats ex. #2

	8:30 am -12:00 pm	12- 5 pm	Evening
Mon 28 MK	Passage planning	Field testing / data trials Calibrate hydrophone	<i>Hydrophone calibration exercise</i>
Tue 29 MK	Passage planning Due: Hydrophone calibration ex.	Distance correction testing	<i>Read journal club article</i>
Wed 30 MK	Passage planning	Journal Club	
Thu 01 MK	Passage planning		<i>Stats exercise #2</i>
Fri 02 MK	Passage planning Due: Stats ex. #2		Juan's B-day
Sat 03 MK	Passage planning	Advisor meetings pm	
Sun 4 MK	Passage planning	Return to FHL – clean Gato Verde	

jdwood 3/26/08 10:15 AM

Comment: Labor Day

jdwood 3/26/08 10:08 AM

Comment: Rena Escobedo in town

Week 6: May 05 – 11 (on land for single week of data analysis)

Goals & themes:

- Obtain feedback on preliminary results and refine methods and proposal accordingly
- Consider entire food chain in the Salish Sea
- Implement intermediate phases of service project

Assignments:

Due : Wed 2:00 – preliminary data products

Due : Fri 5:00 – final draft of proposal; refined field data sheet due Fri 5:00

	8:30-10 am	10:30-12	12-2	2-3:30 pm	4-5:30	Evening
Mon 05	Mentored analysis			Tim Hunt: Boat noise and echolocation clicks	Mentored analysis	<i>Read journal club article</i>
Tue 06	Mentored analysis Naturalist gear-up workshop			Journal Club		
Wed 07	GIS tutorial (8:30-10:30)	Lynne Barre:		<i>Preliminary data product</i>		
Thu 08	Prototypical papers and research paper rubric	Guided proposal work		Advisor meetings		
Fri 09		Guided proposal work		Re-provisioning planning	Re-provision	<i>Final draft of proposal; Data sheets –5 pm</i> Prepare/print articles for journal club at sea
Sat 10	Time off					Clean and pack
Sun 11	check-out by 11am Embark in late afternoon ?					

Scott Veirs 3/10/08 11:09 PM
Comment: Cinco de Mayo!

jdwood 3/27/08 2:35 PM
Comment: Week of Whale Watch Operators Gear Up.

jdwood 3/31/08 8:54 PM
Comment: Anne Beaudreau at FHL for research on lingcod

Scott Veirs 3/10/08 11:10 PM
Comment: Mother's Day!

Week 7: May 12 – 18 (Third week at sea; Guest berths: Marla Holt?)

Goals & themes:

- Intensify observations
- Sustainability (policy in conservation)

Assignments:

Due: Tue 8:30 – Peer evaluations

Due: Sat 8:30 – Tidal energy calculation ex.

Due: Work on Intro & methods section of paper

	8:30 am -12:00 pm	12- 5 pm	Evening
Mon 12 TS	Passage planning	Group Science Planning: opportunities to collaborate?	<i>peer evaluation of cooperation/leadership & performance tasks</i>
Tue 13 TS	Passage planning Peer evaluation due		<i>Read journal club article</i>
Wed 14 TS	Passage planning	Journal Club	
Thu 15 TS	Passage planning	Discussion on Island Biogeography & "Song of the Dodo"	
Fri 16 TS	Passage planning	Advisor meetings	<i>Tidal energy calculation exercise</i>
Sat 17 TS	Passage planning Due: Tidal energy calculation ex.	Re-provision / clean Gato Verde	
Sun 18 MK	Passage planning		

Week 8: May 19 – 25 (Fourth week at sea; Guest berths: Scott)

Goals & themes:

- Continue observation and analysis
- Sustainability (human / environment interactions)
- Marine science (monitoring physical properties of the marine environment)
- Keep thinking about or working on the group service project
- Applying science to conservation

Assignments:

Due : Work on results section of paper

	8:30 am -12:00 pm	12- 5 pm	Evening
Mon 19 MK	Passage planning		Read journal club article
Tue 20 MK	Passage planning	Methods of monitoring the marine environment (Physical Oceanography) (SV)	<i>Read journal club article</i>
Wed 21 MK	Passage planning	Journal Club	
Thu 22 MK	Passage planning		
Fri 23 MK	Passage planning	Advisor meetings	
Sat 24 MK	Passage planning	Re-provision / clean Gato Verde	
Sun 25 TS	Passage planning		

Scott Veirs 3/30/08 5:23 PM
Comment: Full moon

jdwood 3/26/08 10:18 AM
Comment: Wendy to NY and SA

Week 9: May 26 – June 01 (Fifth week at sea; Guest berths:Darcie Larson?)

Goals & themes:

- Complete observations and continue analysis
- Adding statistical rigor to results (tabular or figures)
- Ethics of authorship and data sharing
- Sustainability (humans and climate change)
- Focus of advisor meeting: strategic decisions about results, papers, and presentations

Assignments:

Due: Fri 8:30 – Peer evaluations

Due: Work on discussion section of paper

	8:30 am -12:00 pm	12- 5 pm	Evening
Mon 26 TS	Passage planning		
Tue 27 TS	Passage planning	Discuss final paper and presentation	
Wed 28 TS	Passage planning	Ethics of authorship, data sharing / collaboration (JW)	
Thu 29 TS	Passage planning	Future opportunities. Next steps.	<i>peer evaluation of cooperation/leadership & performance tasks</i>
Fri 30 TS	Passage planning Peer evaluation due		
Sat 31 TS	Passage planning	Advisor meetings	
Sun 01 TS	Passage planning	Disembark - clean Gato Verde	

Scott Veirs 3/10/08 11:10 PM

Comment: Memorial Day

Week 10: June 02 – 08

Goals & themes:

- Complete analysis and compose final paper
- Prepare and deliver final presentation
- Focus of advisor meeting: feedback on penultimate draft

Assignments:

Due: Wed 12:00 – penultimate draft of paper

Due: Thur 2:00 – practice talk

Due: Fri 3:30 – final presentation

Due: Fri 10pm – final draft of paper

	8:30-10 am	10:30-12	12-2	2-3:30 pm	4-5:30	Evening
Mon 02	Group meeting to organize final week. Office Hours (by sign-up) 8:30-12; 2-5:30					
Tue 03	Office Hours (by sign-up) 8:30-12; 2-5:30					
Wed 04	Office Hours (by sign-up) 8:30-12	<i>By 12pm: penultimate draft of paper to advisors</i>		Advisor meetings		
Thu 05	Office Hours (by sign-up) 8:30-12		<i>By 2pm: load practice talk onto presentation computer</i>	Practice talks (optional)		
Fri 06	Office Hours (by sign-up) 8:30-12			<i>By 3:30: load final talk onto presentation computer and test</i>		<i>By 10pm: final draft of paper</i>
Sat 07	<i>Final talks:</i> 9-12; public/parent lunch 12-2; Clean, pack, and tours of FHL 2-6; Group dessert and slide show?					
Sun 08	Optional breakfast with parents and other guests?					Final evals to tracy@beamreach.org by Sunday June 15